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ABSTRACT

A process-product study explored the relationship between quantity and quality of time spent on reading instruction and student achievement in reading. Subjects, 22 third and fourth grade teachers and their 480 students in a small school district in the Piedmont region of South Carolina, used self-report logs to record the quantity of time devoted to reading instruction and a specially designed observation instrument to measure the quality of instruction. Student achievement was measured with a Cloze test and the Comprehensive Test of Basic Skills, and correlations were computed between quantity and quality of time spent on reading instruction and the two achievement measures. The lack of statistically significant findings may be accounted for by incorrectly completed self-report logs and questionable interrater reliability in the operation of the observation instrument. An ad hoc analysis of the study suggests that an emphasis on the pre-teaching component of reading instruction should be a step toward more effective reading instruction. (Six tables of data are included and 28 references are attached.) (RS)

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Quantity and Quality of Reading Instruction as it Relates to Student Achievement in Reading

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Abstract

This process-product study explores the relationship between quantity and quality of time spent on reading instruction and student achievement in reading. Subjects were 22 third and fourth grade teachers and their 480 students. Quantity of time was measured with teacher self-report logs while quality of time was measured with a specially designed observation instrument. Student achievement was measured with a CLOZE test and The Comprehensive Test of Basic Skills. Teachers were observed three time during the school year. Pearson Product Moment correlations were computed between quantity and quality of time spent on reading instruction and the two achievement measures.

Quantity and Quality of Reading Instruction as it Relates to Student Achievement in Reading

To measure or quantify teacher effectiveness is a difficult task. According to Winne and Marx (1977), teacher effectiveness refers to the study of "whether a particular teacher act or strategy influences gains in student achievement" (p. 670). Research attempts to investigate teacher acts and strategies have failed to determine conclusively what constitutes an effective teacher; however, this in no way diminishes the significance of the problem. Educators need to know what it is that makes a teacher more or less effective.

This study will isolate a number of teacher behaviors demonstrated in current research to relate to teacher effectiveness and investigate the impact of these teaching behaviors on student achievement in reading. Specifically, the impact of quantity of instructional time and quality of instructional time on student achievement in reading have been selected for consideration. These particular issues are appropriate for study given the current emphasis on accountability and the "back to basics" movement.

John B. Carroll writes in a 1963 article, "the learner will succeed in learning a given task to the extent that he spends the amount of time he needs to learn the task" (p. 725). Carroll sees determinants of time needed to include: (a) learner aptitude, which is partially inherited and partially dependent upon prior learning; (b) ability to understand

instruction, which is a combination of general intelligence and verbal ability; and (c) quality of instruction, which is the degree to which a task is presented and organized in such a way that the learner can grasp it as rapidly and efficiently as possible.

Anderson, Evertson, and Brophy report on a 1979 process-product study which investigated teacher behaviors within an instructional model. This model is basically a directed reading activity augmented with certain prescribed teacher behaviors for questioning and responding to students. The authors found that, "The teacher's use of time, . . .had important relationships with achievement. The longer the reading group, the higher the achievement" (p. 215).

A 1978 study by Kiesling investigated the relationship of instructional time to student achievement gain scores. Basing his study on Carroll's 1963 article, Kiesling relied on a self-reporting technique to measure instructional time. Kiesling found:

> Classroom teacher large and small group instruction was related to performance between 30% and 50% of the time on the average. . .and even more than that for students at some levels of ability. . . .these percentages lend strong support to the proposition that the amount of classroom instruction is important. (. 579)

In critiquing a 1976 study by Bennett, Rosenshine (1978) points to time allocated as positively related to reading achievement. The

Bennett study suggests, Rosenshine claims, "that formal classrooms obtain their results, i.e., greater achievement gains, because they use instructional variables (particularly orderliness) which lead to more academic engaged time and hence to more content covered" (p. 167).

A 1981 study by Corda, however, suggests that understanding student achievement in reading to be singly related to quantity of instructional time is overly simplistic. In her study involving culturally disadvantaged students, Corda isolated a factor described as a combination of atmosphere, anxiety, acceptance, and attitude (p. 82) which influences student achievement in reading. These factors might collectively be called quality of instruction.

Bloom (1976), in his model of school learning, emphasizes quality of instruction defining quality as relations between the teacher and the student, between the organization of the content and the objectives of the instruction, and between the availability of time and resources to accomplish the instruction. Anderson (1973), drawing on Bloom's model and on current research, devised an instructional model to incorporate his notion of quality instruction--mastery learning or teach, test, reteach, retest.

Fisher et al. (1975) designated Academic Learning Time (ALT) as a measure of quality of instruction defining ALT as "the amount of time a student spends engaged in a task that produces few student errors and which is directly related to a defined content area" (p. 7).

Observational studies of second and fifth graders by Fisher and his colleagues demonstrated that 10% of the residual variance in achievement (as measured by standardized tests) could be attributed to ALT (pp. 126-127).

The present naturalistic study employs a process-product design. It is an evaluation of the process in the classroom (reading instruction), and its relationship to the product (student achievement)--a procedure encouraged by Dunkin and Biddle (1974) in their book, The Study of Teaching. To avoid the problem of discrepancy between what teachers say they do and what they actually do (a concern identified by Chall and Feldmann, 1967), classroom observation was chosen as the primary means of gathering data. Both teacher and student behavior was observed over the course of a school year without manipulating the behavior in any way.

Independent variables for the study include quantity of time spent on reading instruction as measured in teacher self-report logs and quality of instructional time as measured by an observation instrument. Dependent variables include student achievement gain on a CLOZE test and student achievement gain on The Comprehensive Test of Basic Skills, (CTBS).

Hypotheses for this study are: (a) a measure of the quantity of time which the teacher spends on reading instruction will correlate significantly with measures of reading achievement; and (b) a measure

of the quality of time which a teacher spends on reading instruction will correlate significantly with measures of reading achievement. Research cited supports the correlation between quantity of time and quality of time spent on instruction and student achievement. Also in defining quality of instruction for the present study and subsequently designing an observation instrument, a review of the literature indicated a significant correlation between those behaviors incorporated into the observation instrument and student achievement.

Method

Subjects

Subjects participating in the study were from a small school district in the Piedmont region of South Carolina. The school district is adjacent to a small city, and its student population is a rural-suburban mix.

Twenty-two third and fourth grade female teachers participated in the study. The experience range of these teachers was from one to twenty years. This sample included all of the third and fourth grade teachers in the district with the exception of two teachers who would not teach a full year because of pregnancy leave. The cooperation of these teachers was secured through the district administrative staff; teachers received no financial remuneration for their participation.

Achievement data were gathered on the 480 students of the 22 teachers involved in the study. However, attrition and incomplete data

lowered this number to 360 by the end of the school year. All classes were heterogeneously grouped with some students above and some below grade level. The racial mix of children was comparable to that of the district and the state as a whole.

Materials

Two different instruments were used for gathering data on the independent variables (quantity and quality of reading instruction). In order to measure quantity of time spent on reading instruction, structured log sheets were provided for each teacher. Log sheets were to reflect actual time spent, i.e., allocated time minus time lost due to interruptions.

Quality of time was measured with an observation instrument especially designed for this study. Based on an extensive review of the literature concerning teacher behavior and reading achievement (for example--Bennett, 1976; Bloom 1956; Carey & Smith, 1978; Collinge, 1976; Dewey, 1938; Ginsburg & Opper, 1979; Goodman, 1970; Quandt, 1977; Sandefur, 1976; Tierney, Readence, & Dishner, 1980; and Vacca, 1980), five broad categories of behavior were included on the observation instrument--two dealing more directly with the relationship between the teacher and the student, and three dealing with specific methods and techniques for teaching reading. An outline of these categories is provided in Table 1.

Insert Table 1 about here

Once categories were designated, a paragraph length rationale was constructed to define and clarify each category. A 9 point Likert Scale was selected as the defice for rating teacher behaviors. In order to provide anchored guidelines on the Likert Scales for an observer, a range of five behaviors characteristic of each category was identified. Prior to finalizing the instrument, five teacher educators ranked each group of five behaviors from most desirable to least desirable and located these behaviors on the appropriate Likert Scale. An average of the responses of these teacher educators was used to determine final placement of these anchored guidelines on the Likert Scales. Sample pages of the observation instrument are provided in Tables 2, 3, and 4. A complete copy of the instrument may be obtained from the author.

Insert Tables 2, 3, and 4 about here

For gathering data regarding the dependent variables (student achievement gains), a CLOZE exercise was developed. A passage of approximately 300 words was selected from the 3^2 level basal in the 1977 Holt, Rinehart, and Winston series--the series being used by the school system involved. Leaving the first and last sentence of the

passage intact, every seventh word was deleted and a blank was supplied in its place. A copy of this CLOZE test may be obtained from the author. The standardized test used for this study was that available from the school system--The Comprehensive Test of Basic Skills (CTBS), (1974).

Design and Procedure

Initially meetings were held with the 22 teachers involved in the study. The major purpose of these meetings was to distribute materials including logs for recording time spent on reading instruction and the pre-year CLOZE test for students.

When completing log sheets, teachers were instructed to record actual time spent on reading instruction during the last full week of each month--September through April. These log sheets were collected on a regular basis by the author. A quantity of instruction score was derived for each teacher by adding the total number of hours spent on reading instruction as reported on the eight log sheets.

Teachers were asked to administer the CLOZE test to their students during the month of September. Students were to supply missing words based on the context of the passage. No time limit was to be imposed. Only word exact responses, as opposed to word acceptable, were counted as correct. Studies by Hinofotis and Snow (1980) and by Stubbs and Tucker (1974) have demonstrated that both methods rank students the same way. Also using only word exact

responses reduces the amount of subjectivity inherent in determining whether or not a response is acceptably synonymous. Student scores were simply the number of items correct; average number of correct responses was calculated for each class. This same procedure was followed in April of that school year using the same CLOZE test. Differences in pre- and post-year scores were determined for each class involved.

This initial meeting with teachers was also used for setting up the first of three rounds of classroom observations--one in the fall, one in the winter, and one in the spring. The classroom observations, conducted by the author or one of five co-observers, lasted approximately forty-five minutes each. All three observations were scheduled ahead of time with the classroom teachers. All co-observers were former classroom teachers; they were thoroughly familiarized with the instrument prior to beginning observations. A quality of instruction score was derived for each teacher by averaging the total scores from each of the three observations.

Pre- and post-year standardized test scores for each of the classes involved were provided to the author by the school district. The different in pre- and post-year class averages were computed as an indication of achievement gain in reading.

Pearson Product Moment correlations (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975, p. 223) were subsequently computed

between quantity of time spent on reading instruction and student achievement gain as measured by the CLOZE test and by the CTBS. In like manner, Pearson Product Moment correlations were computed between quality of time spent in reading instruction and student achievement gain as measured by the CLOZE test and by the CTBS.

Results

The first hypothesis addressed by this research--that the quantity of time spent on reading instruction would correlate significantly with measures of reading achievement--was not supported by the current study. The second hypothesis addressed--that the quality of time spent on reading achievement would correlate significantly with measures of reading achievement--was not supported by this study. Pearson Product Moment correlations and probability levels for these hypotheses are presented in Table 5. Means and standard

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Insert Table 5 about here

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deviations for all independent and dependent variables are presented in Table 6.

Insert Table 6 about here

Discussion

The results of this study were confounded by a number of factors which may account for the absence of statistically significant findings. Regarding Hypothesis 1, quantity of time spent, it became evident early in the study that teachers were not using the log sheets with the degree of sensitivity desirable. Rather than recording actual time spent (allocated time minus interruptions), teachers simply wrote down the amount of time designated for reading instruction in their planning books.

Regarding Hypothesis 2, quality of time spent, the fact that five co-observers as opposed to one participated in gathering data may have affected the reliability of the results. Also using a 9 point Likert Scale on the observation instrument, though this allowed high discrimination, resulted in less agreement between observers. An additional concern was the difficulty level of the CLOZE test; it should have been prepared using a 2^2 or a 3^1 level basal reader.

In post hoc analysis of the data generated for this study, each of the categories and sub-categories on the observation instrument were correlated individually with class achievement gains on the CLOZE test and the CTBS. Teacher Use of Recommended Pre-Teaching Activities ($\bar{X}$ = 6.03; $\underline{SD}$ = 1.24) correlated .3899 with CLOZE achievement, a ratio significant at the $<.05$ level of confidence. Interpreted, this means that teacher performance on the pre-teaching component of the

lesson--setting context, pre-teaching vocabulary, and making assignments--predicts 15% of the variance in student achievement gain on the CLOZE test. This finding is consistent with the thinking of schema theorists who contend that what child brings to print to a large extent determines what a child will get from print. Piaget (Ginsburg and Opper, 1979), Smith (1978), and Carey and Smith (1978) all support this point of view.

A .548 correlation between Making Assignments and CLOZE achievement ($\overline{X}$ = 5.98; $\underline{SD}$ = 1.48) was also discovered, a figure significant at the <.01 level of confidence. The strength of this correlation implies that the clear, purpose-setting assignment enhances learning. Such assignments clarify goals, focus attention, establish purpose, and enhance motivation. Therefore, an ad hoc analysis of the present study suggests that an emphasis on the pre-teaching component of reading instruction--setting context, pre-teaching vocabulary, and making assignments--should be a step toward more effective reading instruction.

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Table 1

Outline of Categories Included on the Observation Instrument

I. Individualization

A. Adjustment of Difficulty Level of the Material

B. Adjustment for Interests and Background Experiences of Children

C. Adjustment of Objectives

II. Teacher-Student Rapport

A. Teacher Sensitivity

B. Teacher Motivation of Students

C. Teacher Enthusiasm

D. Teacher Control

III. Teacher Use of Recommended Pre-Teaching Activities

A. Teacher Attempts at Setting Context

B. Teacher Attempts at Pre-Teaching Vocabulary

C. Teacher Attempts at Making Assignments

IV. Teacher Use of Recommended Direct Instruction Procedures

A. Teacher Practices of Grouping

B. Teacher Use of Silent Reading

C. Teacher's First General Response to Oral Miscues

D. Teacher Focus on Meaning

E. Teacher Emphasis on Skills

V. Teacher Use of Recommended Follow-Up Procedures

Table 1 continued

A. Teacher Use of Questioning Procedures

B. Teacher Use of Reinforcement Activities

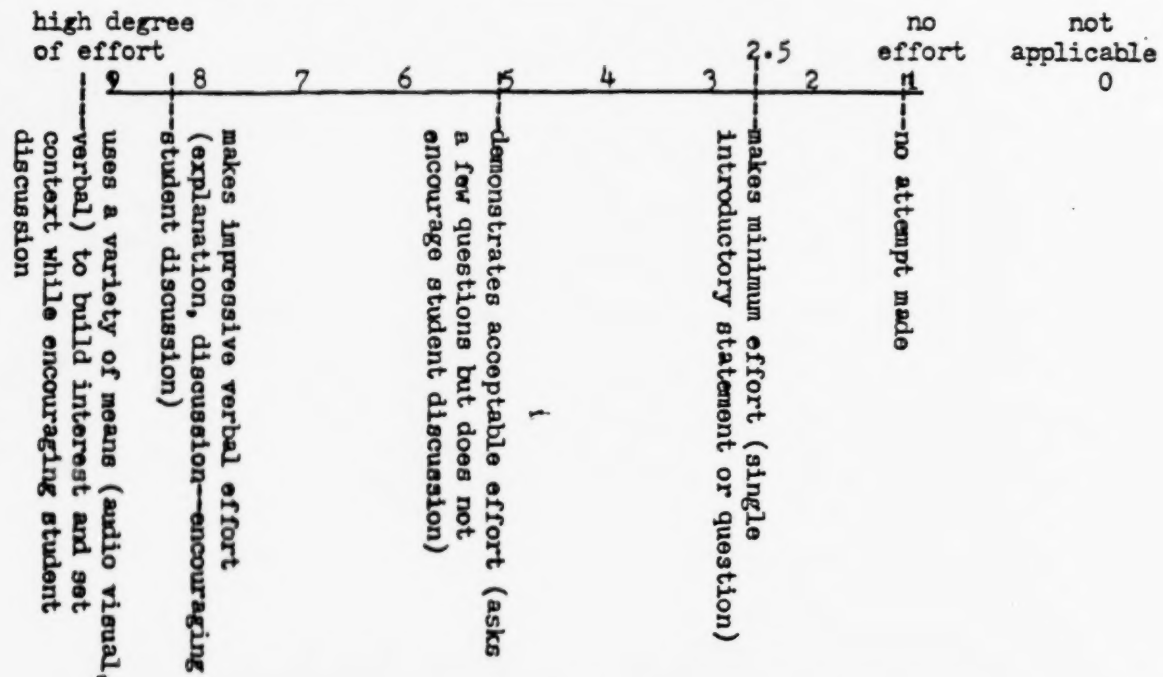
C. Teacher Use of Supplementary Activities

Table 2

Sample Page from Pre-Teaching Category--Setting Context

III. Teacher Use of Recommended Pre-Teaching Activities

A. Teacher Attempts at Setting Context



RATIONALE: The behaviors suggested as guidelines for rating teacher attempts at setting context grow out of a substantial body of research concerning schema theory. It has been demonstrated that comprehension is greatly facilitated, and indeed made possible, if an individual possesses some prior knowledge against which to interpret and evaluate incoming information. The purpose of the context setting portion of a lesson is to provide this background knowledge for students when such information is inadequate and thereby to enhance the students' understanding of the story.

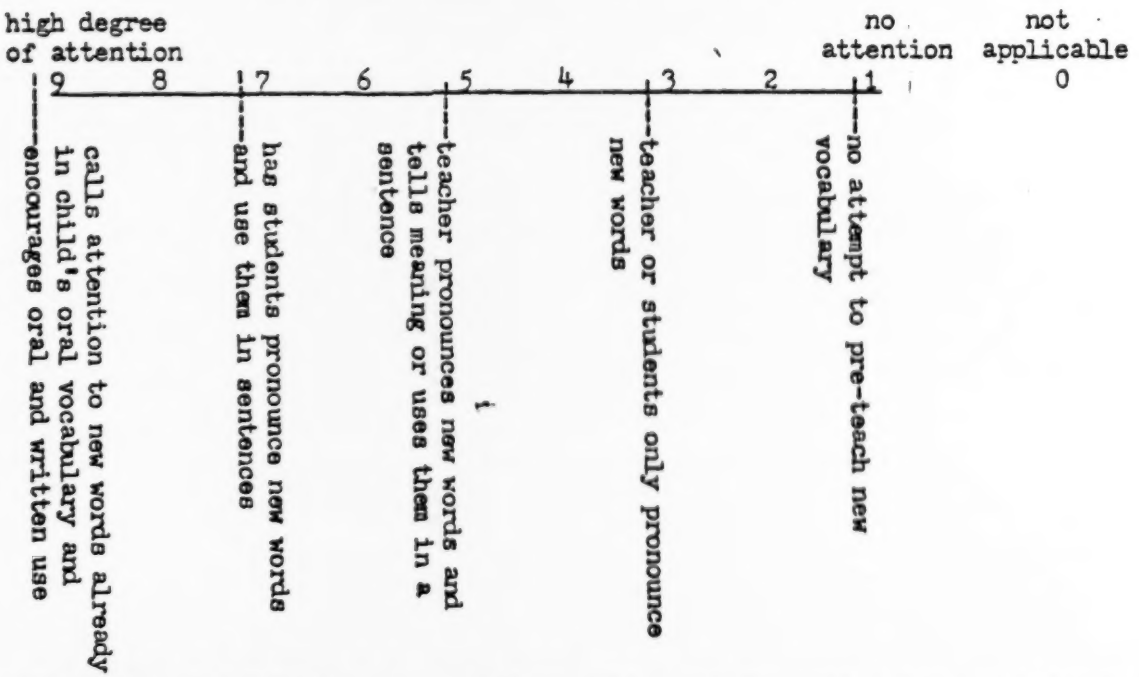
COMMENTS:

Table 3

Sample Page from Pre-Teaching Category--Pre-Teaching Vocabulary

III. Teacher Use of Recommended Pre-Teaching Activities

B. Teacher Attempts at Pre-Teaching Vocabulary



RATIONALE: The behaviors suggested as guidelines for rating teacher attempts at pre-teaching vocabulary, like those for setting context, grow largely from the same body of schema research supporting the role of prior knowledge in the comprehension process. These behaviors also reflect the importance of making a child aware of the relationship between his oral and written language since often a word unknown when encountered in print is an accessible part of a child's listening and speaking vocabularies. It is true that the language in stories is highly redundant and that the context of the story is likely to supply the meaning for many unknown words. However, when a purpose of the lesson is to consciously build vocabulary, direct teaching of new words seems most effective. During oral and silent reading, on the other hand, it is appropriate to help children acquire a wide variety of strategies for identifying unknown words.

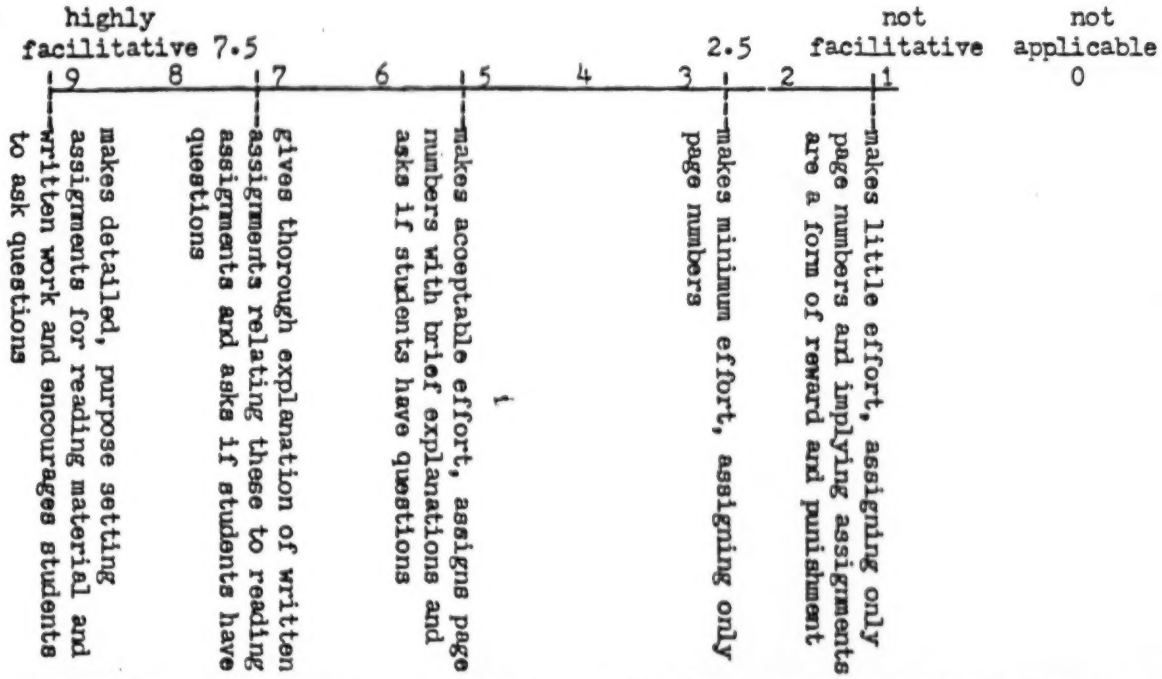
COMMENTS:

Table 4

Sample Page from Pre-Teaching Category--Making Assignments

III. Teacher Use of Recommended Pre-Teaching Activities

C. Teacher Attempts at Making Assignments


highly facilitative
7.5
2.5
not facilitative
not applicable
9
8
7
6
5
4
3
2
1
0
makes detailed, purpose setting assignments for reading material and written work and encourages students to ask questions
gives thorough explanation of written assignments relating these to reading assignments and asks if students have questions
makes acceptable effort, assigns page numbers with brief explanations and asks if students have questions
makes minimum effort, assigning only page numbers
makes little effort, assigning only page numbers and implying assignments are a form of reward and punishment

RATIONALE: The behaviors suggested as guidelines for rating teacher attempts at making assignments are based on the assumption that the purpose setting assignment facilitates comprehension and maximizes a learning experience. Research has shown that purpose setting before reading or writing focuses one's expectations, increases the likelihood that predictions about meaning will be accurate, increases the efficiency of the learning activity, and facilitates the integration of old and new information. At the opposite extreme from the teacher who makes purpose-setting assignments is the teacher who puts only page numbers on the board and tends to use the amount of written work assigned as a disciplinary technique.

COMMENTS:

Table 5

Pearson Correlations and Probability Levels Between Measures of Quantity and Quality of Time and Measures of Student Achievement

		CLOZE		CTBS	
Time Measures	n	r	p	r	p
Quantity of Time Spent on Reading Instruction	22	.0034	.49	.1846	.21
Quality of Time Spent on Reading Instruction	22	.1913	.20	.0784	.36

Table 6

Means and Standard Deviations for all Independent and Dependent Variables

Variables	$\bar{X}$	SD
Independent Variables		
Total Hours Spent on Reading Instruction	60.55	12.01
Total Average on Quality Measure	6.11	1.05
Dependent Variables		
CLOZE Achievement Gain	4.06	2.26
CTBS Achievement Gain	86.57	52.76